REMARKS

Claims 3-8 are pending for further examination. The Applicants would like to thank the Examiner for the comments in the Office Action dated April 7, 2003. The Examiner's comments were helpful and are incorporated into the remarks below.

Title

The Examiner has objected to the title of the invention as not being descriptive. The Applicants submit that the amendment to the title corrects the defect.

Specification

The Examiner has objected to the disclosure for the presence of a double period on page 4, line 14. The Applicants submit that the present amendment corrects the informality.

Objection

The Examiner has objected to Claim 5 for an informality appearing in line 15, in which the adjective "fractions-correctly-predicted" is not followed by a noun, such as "metric." The Applicants respectfully submit that the present inclusion of the word "metric" at this point in Claim 5 overcomes the objection.

Rejections Under § 101

The Examiner has rejected Claims 3-8 as being directed to non-statutory subject matter. The Applicants respectfully submit that the present claims are not directed to the manipulation of "only numbers, abstract concepts or ideas." Rather, the "reference molecules" recited in the present claims are representations of physical objects, namely, molecules that exist, or that can exist in the physical world. Claims drawn to processes of manipulating data representing physical objects or activities is proper statutory subject matter. See M.P.E.P. § 2106(IV)(B)(2)(b)(i). Accordingly, the Applicants respectfully request that the Examiner withdraw the rejection.

Rejections Under § 112

The Examiner has rejected Claim 3 and its dependent claims for lack of antecedent basis with regard to the term "the at least one property" which appears in line 4 of Claim 3. The Applicants have removed the word "the" from line 4 and respectfully submit that this change overcomes the rejection for Claim 3 as well as for Claims 4-8 which depend from Claim 3.

The Examiner has rejected Claim 8 as allegedly containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to make and use the invention. Specifically, the Examiner has stated that the specification does not provide enablement for the practice of choosing one of the preliminary sets which most accurately predicts molecular behavior.

The Applicants respectfully submit that the specification describes "[a] general process of selecting the 'best' set of marker molecules from the different possible selected sets." p. 11 at lines 18-19. In some embodiments, Claim 8's limitation "preliminary set that most accurately predicts molecular behavior of molecules of said set" refers to such a "best" set. FIG. 4 illustrates one example of a process for selecting a highly predictive set, namely, a "best" set. The process is described in greater detail from page 13 at line 10 to page 14 at line 2. Further, an example of creating a model for predicting protein binding is provided from page 14 at line 3 to page 16 at line 19. The example includes the testing of 286 sets of marker molecules and the selection of the single set of marker molecules "with the best predictive accuracy." The Applicants respectfully submit that in light of the present specification, one of ordinary skill in the art would be able to practice the present invention in a manner consistent with Claim 8.

The Examiner further has rejected Claim 8 as allegedly being indefinite as to the phrase "most accurately predicts." The Applicants respectfully submit that a set that "most accurately predicts" is a set that is superior to other sets principally because, when those sets are used to predict molecular behavior, the set that "most accurately predicts" is able to generate predictions which are more often true than the predictions generated by other sets.

One embodiment is described in the example provided at page 14, line 3 to page 16, line 19. In this example, the set that "most accurately predicts" is "the set having MOLCNT at least 6 while maintaining an FCP of at least 82%." page 14 at lines 23-24. It should be recognized that these particular parameters will not necessarily be the defining criteria for such a set in other

embodiments. The criteria for selecting a set that "most accurately predicts" will depend on the "at least one property" being considered and the number and identity of the various reference molecules used to construct the model. Nevertheless, some sets can be viewed as superior to others based on their predictive usefulness. A champion among these is a set that "most accurately predicts." The Applicants respectfully submit that those of ordinary skill in the art will appreciate the meaning of the term "most accurately predicts" as it applies to one set among the various sets of marker molecules that can be used, albeit with varying degrees of success, to predict molecular behavior. The rejection of Claim 8 for "indefiniteness" therefore should be withdrawn.

Rejections Under § 102

The Examiner has rejected Claims 3-8 as allegedly being anticipated by Stanton et al. The Applicants respectfully submit that the teachings of Stanton et al. are inapposite to the present claims. In particular, Stanton et al. do not teach the identification or manipulation of marker molecules. In the present application, the term "marker molecules" means molecules of known behavior to which a molecule of unknown behavior can be compared structurally for the purpose of predicting that behavior. See specification at page 2, lines 2-4. In particular, marker molecules can be used in developing a "model" for predicting behavior in other molecules. See id. at page 4, lines 18-21. Advantageous techniques for selecting marker molecules are described in the specification; for example, Figure 2 "illustrates one specific method for selecting a set of marker molecules from the DTC molecules in the process block of Figure 1." Id. at page 6, lines 16-17. The process is described in detail from page 6, line 16 to page 10, line 11. The final selection of marker molecules is described as follows:

> In this embodiment, a set of marker molecules is defined as every DTC molecule having a MOLCNT of equal to or greater than a selected value while maintaining a selected minimum FCP threshold. Once this set of marker molecules is selected, predictions are made by comparing the structural similarity of a compound with unknown behavior to each of the marker molecules.

Id. at page 10, lines 4-8.

In Stanton et al., none of the molecules that are selected may properly be deemed a "marker molecule." Stanton et al. teach the selection of certain molecules based on antibacterial

properties for the purpose of grouping them with other molecules that are also known to have antibacterial properties. At best, this process would merely correspond to the "selecting of a subset of said set of reference molecules, wherein all of the molecules in said subset possess the at least one property." From there, however, Stanton et al. do not teach or suggest the further selection of marker molecules from a subset of reference molecules. Instead, Stanton's objective is "to determine if the collection of hits identified represented a set of 212 unique classes of compounds, or if some could be grouped to make follow up more efficient." Stanton et al. page 22, col. 2, lines 17-20. Although "[f]ollow-up studies were then conducted on representative structures from each of the subsets involved," there is no selection of marker molecules or the construction of a model by which molecules of known structure, but unknown activity may be evaluated or characterized. Indeed, Stanton et al. are principally interested in determining the drug candidacy of the actual molecules in the groups in the study, rather than in creating a predictive model to identify new compounds of interest.

To the extent that Stanton et al. suggest testing other molecules (in the section related to "HTS Hit Expansion and Follow-Up"), the teaching merely relates to testing other compounds in the same structural class as the "hit." Stanton et al. page 24, col. 1, line 4 to col. 2, line 7. As indicated in the present specification, marker molecules are those that are selected from a subset of reference molecules for the purpose of developing a prediction model. Stanton et al. teach the selection of one molecule, or "hit," at a time for the purpose of exploring the chemical space around that hit. This is not a prediction model - it is merely conventional medicinal chemistry. In the claims, when a plurality of marker molecules are selected, they can be used together to create a single model, which can in turn be used to predict that activity of a candidate molecule. In essence, the plurality of marker molecules are used to predict the activity of a single molecule. To the extent that Stanton et al. teach the selection of more than one "hit," these hits are unrelated to each other and are not useful in combination. Because the development of a prediction model from the hits is not taught or suggested by Stanton et al., none of the molecules described by Stanton are marker molecules. Accordingly, Stanton et al. do not teach any methods of selecting or manipulating marker molecules.

Finally, the Applicants call particular attention to Claim 5. Although the Applicants submit that patentability of Claim 5 can be based solely on its dependence from patentable Claim 3, Claim 5 contains additional limitations that support its novelty over the prior art of record. For

example, Stanton et al. do not teach or suggest selecting a first molecule and "sorting all other molecules of said set in descending order of numerical similarity." Accordingly, Stanton et al. do not teach or suggest "defining a similarity distance" based on the sorting, or defining "a fractions-correctly-predicted metric" based on the similarity distance, or choosing "molecules of said subset having a fractions-correctly-predicted metric which exceeds [a] threshold value." The Applicants note that the Examiner refers to portions of Stanton et al. that describe cluster analysis, but many of the steps of Claim 5 that relate to choosing marker molecules are not taught or suggested by Stanton et al.

CONCLUSION

The Applicants have endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims pursuant the Examiner's objections and to statutory sections 101, 112, and 102 are presented above. Since all of the objections are believed to have been overcome, and the cited art has been shown to be inapplicable, allowance of the claims is earnestly solicited.

If the Examiner has any questions which may be answered by telephone, she is invited to call the undersigned directly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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